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CLINICAL REPORT

Isolated lesser trochanter fracture in adults: An early indicator of tumor infiltration

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KEYWORDS

Lesser trochanter;
Fracture;
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Summary We report on a case of isolated lesser trochanter fracture, without associated trauma, secondary to pulmonary adenocarcinoma metastasis. Treatment consisted in resection–reconstruction by megaprosthesis. This form of isolated fracture is rare, and results from infiltration of the trochanteric area by a malignant tumoral process, which is usually metastatic.

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Introduction

Isolated lesser trochanter fracture has been reported in athletic teenagers [1–4]. Onset follows violent sports activity, usually caused by apophyseal avulsion of the lesser trochanter resulting from sudden iliopsoas muscle contraction [1–3].

Non-traumatic onset is rare in adults [5–10], and is the sign of a tumoral process, which is usually metastatic [5–10].

The present study discusses the epidemiological, diagnostic and therapeutic aspects of this rare entity.

Observation

This 63 year-old man had a history of high blood pressure, benign prostate hypertrophy, hypercholesterolemia under medical treatment, and grade-2 angina treated by CABG in 2008. He consulted elsewhere for sudden onset of pain at the root of the thigh, without associated trauma. AP pelvic X-ray found isolated lesser trochanteric fracture with little displacement (Fig. 1). Analgesics and anti-inflammatory treatment were prescribed, with rest but not non-weight-bearing. He consulted in our department 3 months later for worsening of symptoms. Walking was difficult, with a limp even using two canes. Active hip flexion was

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Figure 1 Isolated lesser trochanteric fracture.

impossible. Palpation found pain in the fold of the groin. Passive hip mobilization was possible but painful. Passive hip joint amplitudes, and particularly abduction and internal and external rotation, were limited by pain. AP and lateral hip X-ray (Fig. 2A and B) showed not only the lesser trochanteric fracture but also osteolysis of the superior extremity of the femur. Whole femur MRI (Fig. 3) showed a 10 × 9 cm tissular mass in hyposignal on T1 in the posteromedial part of the superior extremity of the thigh, with invasion of the trochanteric pillar down to the femoral neck, conserving the lateral femoral cortex. There were no skip metastases.

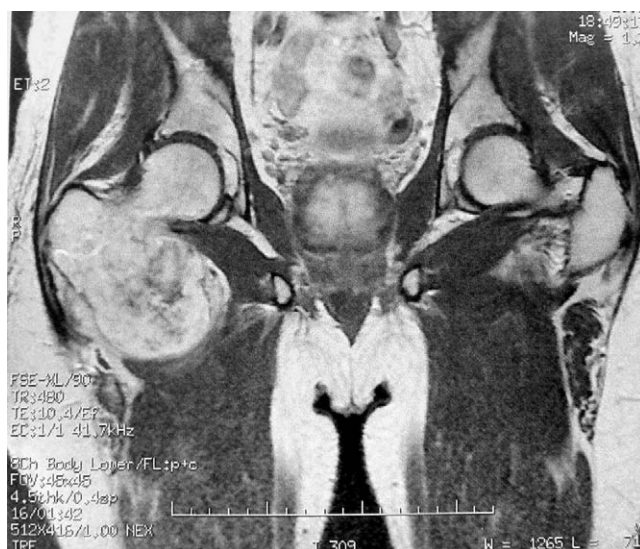


Figure 3 MRI showing 10 × 9 cm tissular mass occupying the posteromedial part of the proximal extremity of the femur, in hyposignal on T1.

Thoraco-abdomino-pelvic computerized tomography (CT) extension assessment found an atelectasic pulmonary opacity of the right lingula and mesenchymatous condensation of the inferior left lobe. Positron emission tomography (PET) found other hyperfixation sites: neck, left subclavicular region, sternum, right humeral shaft, third thoracic vertebra, sacroiliac joint and left iliac wing.

The multidisciplinary bone tumor staff meeting (Cochin Hospital, Paris) decided on primary en-bloc exeresis, englobing the tumor, without preliminary biopsy (Fig. 4), with replacement by reconstruction implant in the same step (Fig. 5). This attitude prioritized recovery of gait in a situation of multiple site involvement. Anatomicopathologic examination found a well-differentiated

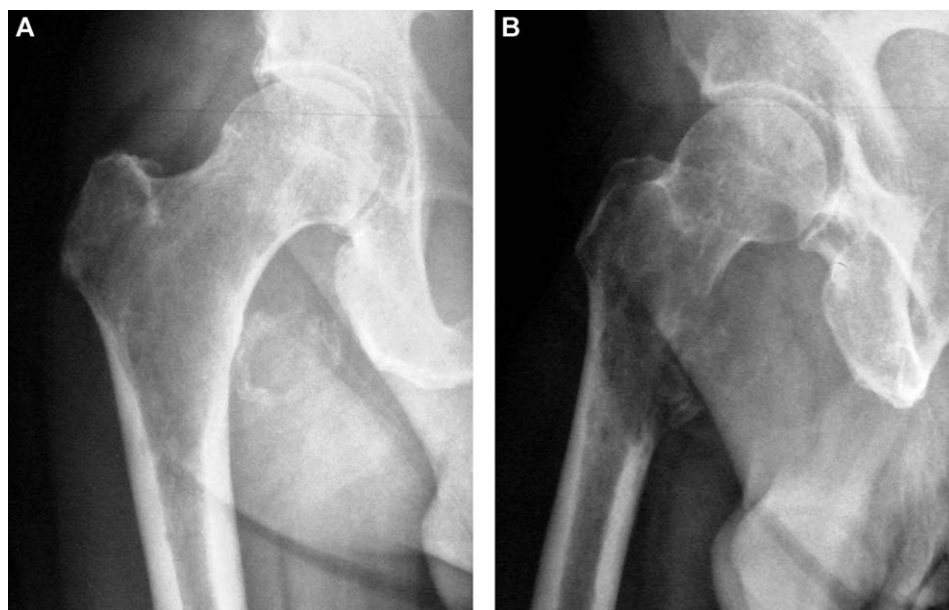


Figure 2 A and B: osteolysis of trochanteric pillar clearly visible on lateral view.



Figure 4 Radiograph of the en-bloc resection specimen.



Figure 5 Reconstruction by megaprosthesis.

mucosecreting metastatic adenocarcinoma of pulmonary origin. Chemotherapy was instituted, associating Cisplatin and Alimta, in four successive courses. The third thoracic vertebra was treated by cementoplasty and radiation therapy.

Functional evolution at 9 months postoperatively was satisfactory, with resumption of walking without cane or limp. Hip mobility was normal and pain-free. The PMA score was 18/18.

Discussion

Lesser trochanter fracture is rare in adults [5–10]: only 33 cases have been reported in the literature. We updated the

review by James and Davies [5], who reported on 295 cases of malignant tumoral process in the superior extremity of the femur; there were 15 cases of lesser trochanter fracture (5%). The author suspected that this rate was exaggerated by recruitment bias, patients being selected in a tumoral orthopedics center. Tumoral infiltration was metastatic in 60% of cases.

Bertin et al. [11] reported four lesser trochanter metastases leading to avulsion: one thyroid, one pancreatic and one prostate cancer and one adenocarcinoma of unknown origin. In Phillips' study [7], the tumors reported were one colon and one prostate cancer, one bronchial adenocarcinoma and one non-Hodgkin's lymphoma.

In primitive lesser trochanter tumor, Afra et al. [10] reported two cases of chondrosarcoma, one Ewing's sarcoma and one solitary plasmocytoma. In James' series [5], the most frequent etiologies were myeloma, Ewing's sarcoma, chondrosarcoma, non-Hodgkin's lymphoma and giant-cell tumor. Jake et al. [12] reported the first case of leukemia implicated in lesser trochanteric avulsion.

The literature review finally found metastatic etiology to be the most frequent, at 70% of cases. The most frequent primitive cancers were myeloma (9%), chondrosarcoma (9%) and Ewing's sarcoma (6%) [5].

Standard X-ray is enough to diagnose lesser trochanter fracture, but requires AP and lateral views if non-displaced forms are not to be missed. Above all, only lateral X-ray provides good visualization of the lytic lesion of the base of the lesser trochanter [5,7].

MRI is essential for the study of the trochanteric region. It enables the extent of tumoral infiltration to be visualized and boundaries to be set in case of resection. It is recommended by most authors [5,7,10,12]. Some have used CT, but mainly for CT-guided biopsy [7,10–12]. Jake et al. [12] recommend performing MRI even if CT is normal. For remote extension assessment, some authors stress the interest of technetium-99m scintigraphy [10–12]. Management depends on the stage of tumor evolution. In advanced stages, preventive osteosynthesis of the superior extremity of the femur associated to palliative treatment is recommended [11–13]. For single metastasis or circumscribed primitive tumor, carcinological resection with prosthetic replacement of the superior extremity of the femur is recommended [11].

Conclusion

Avulsion of the lesser trochanter with no or only minor associated trauma is rare in adults. It is then systematically the sign of malignant, usually metastatic, tumoral infiltration of the lesser trochanter. It should always lead to exploration for the underlying cancer.

Conflict of interest statement

None.

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